

PATENT APPLICATION

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TITLE

"RETAINING SOCKET FOR ELECTRICAL OUTLETS"

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5 CROSS-REFERENCE TO RELATED APPLICATIONS

Not applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable

10 REFERENCE TO A "MICROFICHE APPENDIX"

Not applicable

BACKGROUND

1. Field

15 The present invention relates to a retaining socket for an electrical outlet. More particularly, the present invention relates to a retaining socket which can resist the pulling out of an electrical plug regardless of which direction tension is placed on an electrical cord.

2. General Background

20 A plug for an electrical appliance, such as a vacuum cleaner, can become loosened or pulled from its outlet when the appliance is attempted to be moved to a work area located away from the outlet. Various devices have attempted to address this issue, but each have their own disadvantages. For example, some do not satisfactory protect against tensions from all directions relative to the outlet. Others are permanently attached to an outlet and present an obstacle when not in use. Others
25 require extensive modifications to the outlet and/or plug or require numerous additional components attached in a complex fashion to the outlet and/or plug.

The need exists for a plug retainer which resists pulling out of a plug from all directions, which is low cost to make, and easy to attach and detach from the outlet.

While certain novel features of this invention shown and described below are

pointed out in the annexed claims, the invention is not intended to be limited to the details specified, since a person of ordinary skill in the relevant art will understand that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and in its operation may be made without departing in any way
5 from the spirit of the present invention. No feature of the invention is critical or essential unless it is expressly stated as being "critical" or "essential."

BRIEF SUMMARY

The apparatus of the present invention solves the problems confronted in the art
10 in a simple and straightforward manner. What is provided is a retaining socket which can resist the pulling out of an electrical cord.

It is an object to provide a system for retaining an electrical plug in the socket of an electrical outlet.

It is another object to provide a retaining system which is readily attachable to
15 and removable from the plug and the outlet.

It is a further object to provide a retaining system which does not require elaborate modification to the plug or the outlet.

It is an additional object to provide a retaining system which can be stored out of the way when not in use.

It is yet another object to provide a retaining system which is inexpensive to
20 manufacture and is composed of a minimal number of cooperating parts.

These and other objects of the present invention, as well as the advantages thereof over existing prior art forms, which will become apparent from the description to follow, are accomplished by the improvements hereinafter described and claimed.

25 In general, a system for retaining a plug in a socket of an electrical receptacle includes a plate mounted to the receptacle in such a way that the socket remains exposed. The plate carries opposed lugs which detachably connect with a retaining clip and the retaining clip can cradle the plug when mounted on the lugs.

The drawings constitute a part of this specification and include exemplary
30 embodiments to the invention, which may be embodied in various forms.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

For a further understanding of the nature, objects, and advantages of the present invention, reference should be had to the following detailed description, read in conjunction with the following drawings, wherein like reference numerals denote like elements and wherein:

Figure 1 is an exploded perspective view of a flanged retainer clip, outlet plate, and electrical plug.

Figure 2 is a perspective view of the retainer clip in Figure 1 showing the clip attached to the outlet plate and retaining an electrical plug.

Figure 3 is an exploded perspective view of a ribbed retainer clip and outlet plate.

Figure 4 is a sectional view of the lug taken along lines 4-4 of Figure 3.

Figure 5 is an exploded perspective view of a ribbed retainer clip and outlet plate.

Figure 6 is a sectional view of the lug taken along lines 6-6 of Figure 5.

PREFERRED EMBODIMENTS FOR CARRYING OUT THE INVENTION

Detailed descriptions of one or more preferred embodiments are provided herein. It is to be understood, however, that the present invention may be embodied in various forms. Therefore, specific details disclosed herein are not to be interpreted as limiting, but rather as a basis for the claims and as a representative basis for teaching one skilled in the art to employ the present invention in any appropriate system, structure or manner.

Electrical plug retainer is generally indicated reference numeral 10 in the drawings and is adapted to retain plug 135, carried by cord 130, in a conventional wall receptacle 20. Electrical plug retainer 10, as illustrated in Figures 1-6, generally includes a modified receptacle plate (generally indicated by reference numeral 40) and clip (generally indicated by reference numeral 70) having a slot 120 which slot allows passage of cord 130, but not plug 135. When attached to face plate 40, clip 70 retains plug 135 in socket 30. Clip 70 retains plug 135 in socket 30 notwithstanding pulling forces being applied to cord 135 in various directions.

Face plate 40 includes conventional openings exposing sockets 30 of receptacle 20 when plate 40 is attached to receptacle 20, such as by screw 45. Face plate 40 can include at least one set of opposed lugs 50, 60 positioned on opposing sides of socket 30 of electrical outlet 20 (located behind plate 40). In one embodiment, plate 40 can include a second set of opposed lugs 51,60 on opposing sides of socket 35. Furthermore, in another embodiment opposed lugs 50, 60 can be vertically oriented, and optionally extend the length of sockets 30,35. Lugs 50,60 may be constructed of metal, plastic, injection molded plastic, wood, or any other material which is substantially strong and durable. They may be attached to plate 40 using any conventional means such as adhesives, welding, or mechanical means. Alternatively, lugs 50,60 may be integrally molded, formed, or fabricated with plate 40.

Clip 70 may be constructed of metal, plastic, injection molded plastic, wood, or any other material which is substantially strong and durable. Preferably clip 70 is generally U-shaped in configuration and can include base 75, first arm 80, and second arm 90. First and second arms 80,90 can include tips 100,110. Second arm 90 can be provided with slot 120 allowing cord 130 to freely pass and/or slide therethrough but resisting movement of plug 135. Clip 70 can be rounded, square shaped, V-shaped or configured otherwise to allow adequate flexing of arms 80,90.

Figure 1 is an exploded perspective view of a flanged retainer clip 70, outlet plate 40, and electrical plug 135. Clip 70 can include first and second arms 80,90 having first and second tips 100,110. First and second tips 100,110 can be in the form of flanges 140,150. Slot 120 can be formed in second arm 90 and extending through tip 110 and be of sufficient size to allow access of cord 130, but restrict movement of plug 135.

Slot 120 can extend through second arm 90, base 75, and partially into first arm 80. In one embodiment slot 120 can extend completely through first arm 80 and tip 100 effectively creating dual sets of first and second arms 80,90. However, such embodiment would not have as much structural support and may be prone to snapping out of lugs 50,60 when tension is placed on cord 130.

Second arm 90 is shown including slot 120 and having two portions of tip 110 and two portions of flange 150. Such dual portions interconnect with the dual portions

of lug 60 and accommodate screw 45 of faceplate 40. Tip 100 of first arm 80 forms flange 140 and interconnects with lug 50.

Plug 135 can be placed inside of clip 70 as shown by arrow 350. Cord 130 slides through slot 120 and clip 70 cradles plug 135.

5 Plug 135 can first be inserted into socket 30. Clip 70 can next be placed over plug 135 by sliding cord 130 into slot 120. Clip 70 can next be mounted to plate 40 as shown by arrows 330,340. First and second arms 80,90 are squeezed towards each other and then slid into first and second lugs 50,60. First and second arms 80,90 are then allowed to expand so that tips 100,110 comprising flanges 140,150 will interlock
10 with first and second lugs 50,60. Clip 70 will then cradle plug 135 as shown in Figure 2.

Figure 2 is a perspective view of the retainer clip 70 in Figure 1 showing clip 70 attached to plate 40 and retaining electrical plug 135. Thus mounted clip 70 will resist tension in plug 135 created by a pulling on cord 135 and resist a break the
15 connection between plug 135 and socket 35. The tension will be transferred to first and second arms 80,90, tips 100,110, and then by first and second lugs 50,60.

To remove clip 70 first and second arms 80,90 are squeezed towards each other and then tips 100,110 comprising flanges 140,150 can be slid out of first and second lugs 50,60. In this manner tips 100,100 can be detachably connectable to first and
20 second lugs 50,60. Clip 70 may be left in position on plate 40, as desired, or may be readily removed and stored away until a subsequent use.

In one embodiment first lug 51 is attached to plate 40 on an opposing side of socket 35. Lug 60 can also serve as an opposing lug for lug 51, or alternatively a second lug could be mounted on plate 40. A second clip 70 can be provided allowing
25 two retaining systems for a single electrical outlet. The operation of the second clip 70 would be substantially the same as described above.

Figure 3 is an exploded perspective view of a ribbed retainer clip 71 and outlet plate 40. In the embodiment shown clip 71 is generally U-shaped and includes first and second arms 80,90, tips 100,110, and slot 120. Tips 100,110 can comprise ribs
30 160,170. Ribs 160, 170 can be shaped in the form of a parabola or curved to facilitate attaching and detaching from lugs 50,60. Alternatively, ribs 160,170 can be flanged

similar to the embodiment shown in Figures 1 and 2, but with the flanges pointing inwardly instead of outwardly. Also alternatively, ribs 160,170 can be shaped in the form of a semicircle or trapezoid (similar to that shown in Figure 5), shaped in the form of a rectangle, or other shape which allows a detachable connection to lugs 50,60.

5 Lugs 50,60 are shown vertically oriented and extending the length of sockets 30,35. Alternatively, lugs 50, 60 can be horizontally oriented (similar to Figures 1-2). Also alternatively, lugs 50,60 can not extend the length of sockets 30,35, but be confined to one socket such as 30 or 35. For example, there may be two sets of lugs 50,60, respectively for sockets 30,35.

10 Figure 4 is a sectional view of lug 50 taken along lines 4-4 of Figure 3. Lug 50 can be attached to plate 40. Lug 50 can include curved portion 180 having vertex 210. Curved portion 180 can be in the shape of a parabola 200. As shown in Figure 3, Lug 50 can include spacer 185 separating curved portions 180,181 and also base portions 188,182. Spacer 185 and base portions 188,182 facilitate structural attachment of lug
15 50 to plate 40. Spacer 185 is optional and is believed to provide additional structural support for lug 50 and stability for the detachable connection between clip 71 and lugs 50,60.

 Lug 50 can extend the vertical distance between sockets 30,35 as shown in Figure 3 and can include additional spacer 186, base 187, and curved portions 183,184.
20 Alternatively, a separate lug can be provided not connected to lug 50. Construction of lug 60 can be substantially the same as lug 50.

 Connection of clip 71 to plate 40 is similar to that described for clip 70. However, first and second arms 80,90 are moved away from each other for attachment to lugs 50,60. To facilitate this outward movement of arms 50,70, curved portions
25 180,181 and 190,191 are provided. When tips 100,110 touch curved portions 180,181 and 190,191, tips tend to move outward allowing clip 71 to be pushed onto lugs 50,60 and snap in place. Ribs 160,170 will grab hold of curved portions 180,181 and 190,191. Space 121 in arm 80 is provided to work around spacer 185, however, if spacers 185 and/or 195 are not used space 121 can be eliminated.

30 Curved portions 180,181 and 190,191 can also facilitate removal of clip 71 from lugs 50,60. As clip 71 is pulled from plate 40 the curved portions of curved portions

180,181 and 190,191 located adjacent the face 41 of plate 40 and interacting with ribs 160,170 will tend to cause arms 80,90 to move outwardly thus allowing clip 71 to snap off. However, such a design may also tend to allow clip 71 to pop off when tension is applied to cord 130. Alternatively, curved portions 180,181 and 190,191 can be in the shape of half parabolas and ribs 160,170 can be in the shape of rectangles and/or merely flanged. For example, interior face 180' can be flat and parallel to face 41 of plate 40. In such alternative constructions, tension on cord 130 would not tend to push out arms 80,90, however, arms 80,90 would be pulled apart to remove clip 71 from lugs 50,60.

Figure 5 is an exploded perspective view of a ribbed retainer clip 72 and plate 40. Its construction is similar to that of clip 71. Arms 80,90 can include tips 100,110 which comprise ribs 160,170. Ribs 160,170 can be trapezoidal in shape or other shapes such as those described for Figure 3. Additionally slot 120 can and gap 121 can be offset from the longitudinal center lines of arms 80,90. Such offsetting is believed to give clip 72 added stability against tensions in cord 130 which are not perpendicular to the face of plate 40. Because slot 120 and space 121 are offset spacers 245,255 can be respectively positioned to accommodate such offsetting. As with clip 71, spacers 245,255 can be omitted, but when included should provide added stability of clip 72 when attached to lugs 50,60.

Figure 6 is a sectional view of lug 50 taken along lines 6-6 of Figure 5. Lug 50 can include angled portion 240 having top 270. Angled portion 240 can be in the shape of a trapezoid 270. Similar to the discussion of Figures 3-4, the face 240' of angled portion 240 can be parallel to face 41 of plate 40 to resist tension in cord 130 from pulling out clip 72. Ribs 160,170 can be of various additional shapes such as parabolic, curvilinear, rectangular, and flanged.

The following is a list of reference numerals used in the application:

LIST OF REFERENCE NUMERALS

(Reference No.)	(Description)
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10	electrical plug retainer
20	electrical receptacle

	30	socket
	35	socket
	40	plate
	41	face of plate 40
5	45	screw
	50	first lug
	51	first lug
	55	upper cap
	56	lower cap
10	60	second lug
	65	upper cap
	66	lower cap
	70	clip
	71	clip
15	72	clip
	75	base
	80	first arm
	90	second arm
	100	tip
20	110	tip
	120	slot
	121	gap
	130	electrical cord
	135	plug
25	140	flange
	150	flange
	160	rib
	170	rib
	180	curved portion
30	180'	interface of curved portion 180
	181	curved portion

	182	base
	183	curved portion
	184	curved portion
	185	spacer
5	186	spacer
	187	base
	188	base
	190	curved portion
	200	parabola
10	195	spacer
	210	vertex
	220	parabola
	230	vertex
	240	angled portion
15	240'	interior face of angled portion 240
	241	angled portion
	245	spacer
	250	angled portion
	255	spacer
20	260	trapezoid
	270	top
	280	trapezoid
	290	top
	300	U-shaped.
25	310	inlet
	320	inlet
	330	arrow
	340	arrow
	350	arrow
30		

All materials used or intended to be used in a human being are biocompatible,

unless indicated otherwise.

It will be understood that each of the elements described above, or two or more together may also find a useful application in other types of methods differing from the type described above. Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention set forth in the appended claims. The foregoing embodiments are presented by way of example only; the scope of the present invention is to be limited only by the following claims.